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10/822,061	04/09/2004	Theresa Mary Brown	TUC920030052US1	2087

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EXAMINER

CAMPOS, YAIMA

ART UNIT	PAPER NUMBER
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2185

MAIL DATE	DELIVERY MODE
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08/20/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/822,061	Applicant(s) BROWN ET AL.	
	Examiner YAIMA CAMPOS	Art Unit 2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/9/04</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. The instant application having Application No. 10/822,061 has a total of 30 claims pending in the application; there are 3 independent claims and 27 dependent claims, all of which are ready for examination by the examiner.

INFORMATION CONCERNING OATH/DECLARATION

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63**.

INFORMATION CONCERNING DRAWINGS

3. The applicant's drawings submitted are acceptable for examination purposes.

ACKNOWLEDGEMENT OF REFERENCES CITED BY APPLICANT

4. As required by **M.P.E.P. 609(C)**, the applicant's submissions of the Information Disclosure Statement dated April 9, 2004 are acknowledged by the examiner and the cited references have been considered in the examination of the claims now pending. As required by **M.P.E.P 609 C(2)**, a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

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Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 13-24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

7. As per claims 13-24, Applicant has claimed “program logic”; which implies that Applicant is claiming a system of software, per se, lacking the hardware necessary to realize any of the underlying functionality. Therefore, claims 10-18 are directed to non-statutory subject matter as computer programs, per se, i.e. the descriptions or expressions of the programs, are not physical “things.” They are neither computer components nor statutory processes, as they are not “acts” being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program’s functionality to be realized. In contrast, a claimed computer-readable storage medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program’s functionality to be realized, and is thus statutory.

REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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8. **Claims 1-2, 6-11, 13-14, 18-23, 25-26 and 29-30** are rejected under 35 U.S.C. 102(e) as being anticipated by Leong et al. (US 2003/0182503).

9. As per claim 1, Leong discloses A method for allocating resources, comprising: allocating reserved resources to one or more depth levels, wherein the reserved resources form one or more reserved pools; [**“a plurality 700 of pools (generally referred to as 705) of resources... the resource manager 155 associates each I/O task to one of the pools 705 and allocates any resources needed by a particular I/O task from the pool with which that particular I/O task is associated”** (par. 0111; fig. 7 and related text) wherein “resource manager 155 defines resource pools 705 according to the hierarchical representation (e.g., 200) of the disk array” (par. 0119) and allocates resources from each level of this hierarchical order (see pars. 0017-0019); *wherein the association of each type of I/O task to a certain resource pool is interpreted as setting aside or reserving that resource for allocation of resources to these tasks or processes*] upon receiving a request for allocation of resources, determining a depth level from which to allocate resources; [**for a given task, resources are allocated from the given level of the resource pool to which they are associated (pars. 0097-0099;)**] and allocating a reserved pool from the determined depth level [**resource manager allocates all resources from a given pool (pars. 0097-0098)**].

10. As per claims 2, 14 and 26 Leong discloses The method of claim 1, further comprising: generating control structures that indicate which resources are allocated to which processes [**resource manager 155 allocates available pools of resources to tasks and deallocates resources upon task completion (pars. 0093-0099)** wherein “the resource manager 155 associates each I/O task to one of the pools 705 and allocates any resources needed by a

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particular I/O task from the pool with which that particular I/O task is associated” (par. 0111; fig. 7 and related text)].

11. As per claims 6 and 18, Leong discloses The method of claim 1, wherein the resources are task control blocks **[resources are for example data structures to hold an instance of the I/O task that is generated and nvram slot is an allocation of non-volatile memory sized to hold task specific intermediate state information (par. 0093)].**

12. As per claims 7, 19 and 29, Leong discloses The method of claim 1, further comprising: determining that a reserved pool at the determined depth level has been allocated; and allocating a resource from the reserved pool **[resource manager allocates all resources from a given pool (par. 0097)].**

13. As per claims 8-9, 20-21 and 30 Leong discloses The method of claim 7, wherein when the request is a remote request, the determined depth level is a next depth level; wherein when the request is a local request, the depth level is a current depth level **[“the resource manager defines, for example, a quantity of that resource type and a location of that resource type associated with the set” (par. 0112) “for each defined resource pool 705, the resource manager 155 determines the set of resources that are associated with that respective resource pool 705... the resource manager 155 determines the set of resources also based on configuration information. Configuration information represent the implementation of the storage devices... this hierarchical order of objects 200 represents twelve disks 110 logically related to each other. The physical relationship can vary. For example, to avoid catastrophic failures, the six disks 110 associated with one plex object 215a are located in a locations separate from the six disks associated with the other plex object 215b” (pars.**

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0120-0121) (wherein a location would be local and another would be remote with respect to specific requests) for mirror writes, the resource manager requires two plex I/O tasks and “the resource manager 155 determines that the set of resources for each resource pool 705 associated with these I/O tasks must be proportioned according to the configuration information” (par. 0122)].

14. As per claims 10 and 22, Leong discloses The method of claim 7, further comprising: determining that processing with the resource is complete; and returning the resource to a pool of resources [**“resource manager allocates and deallocates resources in response to requests from the I/O tasks” (par. 0093) resources can be freed in any order (par. 0097)].**

15. As per claims 11 and 23, Leong discloses The method of claim 10, further comprising: when the resource is returned to a reserved pool, determining whether all resources have been returned to that reserved pool; when all resources have been returned, freeing the reserved pool for allocation to another process; and allocating the freed reserved pool to a request waiting for allocation of a reserved pool [**Leong discloses “the resource manager allocates all resources from a given pool at once. For example, the resource manager allocates all resources requested for a mirror write I/O task 610 before allocating resources needed for buffer headers 615. Resources can be freed in any order” (par. 0097) “the resource manager deallocates the resources 610, 615 and 630 (e.g., releases the resources back to the storage system 105 by indicating they are available) and starts the allocation process again” (par. 0100) wherein “I/O task waits, for example on a wait queue, until the occurrence of an event, for example, all the necessary resources becoming available” (par. 0082)].**

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16. As per claim 13. An article of manufacture including program logic for allocating resources, wherein the program logic is capable of causing operations to be performed, the operations comprising: allocating reserved resources to one or more depth levels, wherein the reserved resources form one or more reserved pools; upon receiving a request for allocation of resources, determining a depth level from which to allocate resources; and allocating a reserved pool from the determined depth level [**The rationale in the rejection to claim 1 is herein incorporated**].

17. As per claim 25. A system including circuitry for [*interpreted as intended use (See MPEP 2106 II-C)*] allocating resources, wherein the circuitry is capable of [*interpreted as intended use (See MPEP 2106 II-C)*] causing operations to be performed, the operations comprising: allocating reserved resources to one or more depth levels, wherein the reserved resources form one or more reserved pools; upon receiving a request for allocation of resources, determining a depth level from which to allocate resources; and allocating a reserved pool from the determined depth level [**The rationale in the rejection to claim 1 is herein incorporated; See system in fig. 1 and related text in Leong**].

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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19. **Claims 3 and 15** rejected under 35 U.S.C. 103(a) as being unpatentable over Leong et al. (US 2003/0182503) in view of Morrison et al. (US 2003/0110416).

20. As per claims 3 and 15, Leong discloses The method of claim 1, Leong discloses wherein the allocations occur at a first cluster and further comprising: different clusters having different storage managers [**“storage of information on array 115 is preferably implemented as one or more storage "volumes" that comprise a cluster of physical storage disks 110... each volume is generally assigned its own storage manager” (par. 0038) wherein resource pools are defined before allocating resources to tasks and allowing requests for resources to be processed (pars. 0111, 0114 and 0119) and wherein in mirror operations, disk volumes/clusters are separate from each other (pars. 0121-0124) and wherein some “parent” tasks require children tasks to complete before the parent is allowed to complete (pars. 0084; 0099) note parent and children tasks may be allocated in different clusters]** but does not disclose expressly, at the first cluster, waiting for a second cluster to finish initialization processing before allowing requests for resources to be processed at the first cluster.

Morrison discloses at the first cluster, waiting for a second cluster to finish initialization processing before allowing requests for resources to be processed at the first cluster as [**processes may reside in local or remote devices wherein a process may wait for other processes (in remote devices) to finish initialization before performing any operation (par. 0031)]**].

Leong and Morrison are analogous art because they are from the same field of endeavor of memory access and control; more specifically, allocation and deallocation of resource in a computer system.

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At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the system/method wherein reserved pools of resources are provided to allocate these resources to tasks as taught by Leong, and further have a first cluster, waiting for a second cluster to finish initialization processing before allowing requests for resources to be processed at the first cluster.

The motivation for doing so would have been because Morrison discloses having a first cluster, waiting for a second cluster to finish initialization processing before allowing requests for resources to be processed at the first cluster provides the advantage of enhancing communications abilities of all processes and provides full functionality of local processes to processes in remote devices [(par. 0005)].

Therefore, it would have been obvious to combine Leong with Morrison for the benefit of creating a resource allocation system and method to obtain the invention as specified in claims 3 and 15.

21. **Claims 4-5, 12, 16-17, 24 and 27-28** rejected under 35 U.S.C. 103(a) as being unpatentable over Leong et al. (US 2003/0182503) in view of Singh et al. (US 6,625,159).

22. As per claims 4, 16 and 27, Leong discloses the method of claim 1, further comprising: but does not disclose expressly when the allocation of the reserved pool is unsuccessful, attempting to allocate resources from an unreserved pool.

Singh discloses when the allocation of the reserved pool is unsuccessful, attempting to allocate resources from an unreserved pool as **[the available resources of a buffer pool are divided among reserved and unreserved buffers wherein the reserved buffers ensure each port will obtain the minimum number of buffers needed for communications and the**

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unreserved buffers are available to any port to handle communications having a need exceeding the reserved buffers (col. 2, lines 22-40; col. 3, lines 42-49; col. 4, lines 32-45)].

Leong and Singh are analogous art because they are from the same field of endeavor of memory access and control; more specifically, allocation and deallocation of resource in a computer system.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the system/method wherein reserved pools of resources are provided to allocate these resources to tasks as taught by Leong, and further provide an unreserved pool of resources in addition to the reserved pool from which to allocate resources in case allocation of the reserved resources fails or is unavailable, as taught by Singh.

The motivation for doing so would have been because Singh discloses providing additional unreserved buffers provides the advantage of having resources available during high traffic periods while maintaining fair use of share memory and preventing deadlocks [(col. 2, lines 22-40; col. 8, lines 20-36)].

Therefore, it would have been obvious to combine Leong with Singh for the benefit of creating a resource allocation system and method to obtain the invention as specified in claims 4, 16 and 27.

23. As per claims 5, 17 and 28 the combination of Leong and Singh discloses The method of claim 4, further comprising: when the allocation from the unreserved pool is unsuccessful, placing the request in a data structure to wait for a reserved pool [Leong discloses “if all of the necessary resources are not available (path 420), the state of the I/O task changes to a suspended state 425. In this state, the I/O task waits, for example on a wait queue until the

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occurrence of an event, for example, all the necessary resources becoming available” (par. 0082) and Singh discloses if no reserve buffers are available, the package is dropped (col. 23-31)].

24. As per claims 12 and 24, Leong discloses The method of claim 10, further comprising: when the resource is returned to a reserved pool, allocating the freed reserved pool to a request waiting for allocation of a reserved pool at a current depth level [**“I/O task waits, for example on a wait queue, until the occurrence of an event, for example, all the necessary resources becoming available” (par. 0082) wherein “the resource manager allocates all resources from a given pool at once. For example, the resource manager allocates all resources requested for a mirror write I/O task 610 before allocating resources needed for buffer headers 615. Resources can be freed in any order” (par. 0097)]**, but does not disclose expressly when a resource is returned to an unreserved pool, allocating the freed unreserved pool to a request waiting for allocation of a reserved pool.

Singh discloses when a resource is returned to an unreserved pool, allocating the freed unreserved pool to a request waiting for allocation of a reserved pool as [**the available resources of a buffer pool are divided among reserved and unreserved buffers wherein the reserved buffers ensure each port will obtain the minimum number of buffers needed for communications and the unreserved buffers are available to any port to handle communications having a need exceeding the reserved buffers (col. 2, lines 22-40; col. 3, lines 42-49; col. 4, lines 32-45) wherein “where an unreserved buffer is used... Cu is decremented and the packet buffer is marked as allocated to unreserved” (col. 5, lines 16-18) “once the packet has been transmitted, it must be determined whether the packet**

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occupied a reserved or unreserved buffer. If the packet occupied an unreserved buffer... Cu should be incremented. Hence, after the transmission, the buffer is released to free buffer pool” (col. 5, lines 23-27)].

Leong and Singh are analogous art because they are from the same field of endeavor of memory access and control; more specifically, allocation and deallocation of resource in a computer system.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the system/method wherein reserved pools of resources are provided to allocate these resources to tasks as taught by Leong, and further provide an unreserved pool of resources in addition to the reserved pool from which to allocate resources in case allocation of the reserved resources fails or is unavailable, as taught by Singh.

The motivation for doing so would have been because Singh discloses providing additional unreserved buffers provides the advantage of having resources available during high traffic periods while maintaining fair use of share memory and preventing deadlocks [(col. 2, lines 22-40; col. 8, lines 20-36)].

Therefore, it would have been obvious to combine Leong with Singh for the benefit of creating a resource allocation system and method to obtain the invention as specified in claims 4, 12 and 24.

RELEVANT ART CITED BY THE EXAMINER

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25. The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.

26. The following references teaches allocating resources from a resource pool classified having different levels.

U.S. PATENT NUMBER

US 6,466,559

CLOSING COMMENTS

Examiner's Note

27. Examiner has cited particular columns and line numbers in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Conclusion

When responding to this Office Action:

12. Applicant is requested to indicate where in the disclosure support is to be found for any new language added to the claims by amendment. 37 C.F.R. § 1.75(d)(1) requires such support in

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the Specification for any new language added to the claims and 37 C.F.R. § 1.83(a) requires support be found in the Drawings for all claimed features.

28. Applicant must clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made, and must also explain how the amendments avoid the references or objections. See 37 C.F.R. § 1.111(c).

a. STATUS OF CLAIMS IN THE APPLICATION

29. The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. 707.07(i)**:

a(1) CLAIMS REJECTED IN THE APPLICATION

30. Per the instant office action, claims 1-30 have received a first action on the merits and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yaima Campos whose telephone number is (571) 272-1232. The examiner can normally be reached on Monday to Friday 8:30 AM to 5:00 PM.

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IMPORTANT NOTE

32. If attempts to reach the above noted Examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Sanjiv Shah, can be reached at the following telephone number: Area Code (571) 272-4098.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 14, 2008

/Yaima Campos/
Examiner, Art Unit 2185

/Sanjiv Shah/
Supervisory Patent Examiner, Art Unit 2185